MSDS 420 Exercise 1

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Use the table below for answering **a** through **c** in reference to ERD on Canvas:
  a. List the entities (5 points)
  b. List the attributes per entity (5 points)
  c. List the primary keys and foreign keys (5 points)

Entities	Attributes	Primary Keys	Foreign Keys
Customer	CUS_LNAME, CUS_AREACODE, CUS_INITIAL, CUS_BALANCE, CUS_PHONE, CUS_FNAME	CUS_CODE	
Invoice	INV_DATE	INV_NUMBER	CUS_CODE
Line	LINE_UNITS, P_CODE, LINE_PRICE	INV_NUMBER, LINE_NUMBER	INV_NUMBER, P_CODE
Product	P_QOH, P_DISCOUNT, P_PRICE, P_MIN, P_DESCRIPTION, P_INDATE	P_CODE	V_CODE
Vendor	V_NAME, V_CONTACT, V_PHONE, V_ORDER, V_STATE, V_AREACODE	V_CODE	

  d) Explain why every entity needs a PK (3 points):
    a. Every entity needs a PK because it identifies every unique instance of that entity. It is important so that when data is pulled we know we are pulling the single entity of interest.

  e) Explain the purpose of an FK (3 points):
    a. The FK is used to match to PKs in other entities to represent data relationships in the relational database. These relationships are used to join various data sets and get more information on data.

  f) Explain why not all entities need an FK (3 points):
    a. When an entity relationship has only one to one relationships or one to many where the entity itself represents **only** the "one" portion of the relationship, then the entity does not require an FK as it is joined into other tables to give additional information about that entity.

g) Explain the purpose of a Composite Key. Use an entity from the ERD in your explanation (3 points):

   a. A composite key is used when two columns (keys) in the table combine to form the functional primary key to create the needed uniqueness in that entity. For example, in the ERD, the line entity contains a composite key of inv_number and line_number where the concatenation of the two create uniqueness in the database. Individually, inv_number nor line_number define a unique instance of that entity and therefore requires a composite key.

h) List the three possible types of entity relationship (often called cardinalities) and provide an example for each using the ERD; if the ERD does not have an example of one of the relationships – say so. (3 points):

   a. One to one – there is no example of this in the ERD.
   b. One to many – Any example of this in the ERD is Customer to Invoice entity.
   c. Many to many - there is no example of this in the ERD.

i) Explain referential integrity and how a relational database benefit from this (3 points):

   a. Referential integrity is the principle that enforces valid relationships between various entities in a relational database. It states that every non null foreign key value must match an existing primary key value. This constraint is benefcial because it enforces cross reference between tables and entities.

j) Write the eight business rules are reflected in the Crow's Foot ERD (7 points). Note the red 1 – 8 on the image that represents the 8 business rules. You are given the first rule as an example.

	Business rule
1	Every Invoice must have a customer and only one customer.
2	Every Customer can have zero, one, or many Invoices
3	Every Line must have an invoice and only one invoice
4	Every Invoice must have at least one Line
5	Every Product can have zero, one, or many Lines
6	Every Line must have a Product and only one Product
7	Every Vendor can have zero, one, or many Products
8	Every Product must have a Vendor and only one Vendor